1                         AGENDA-DRIVEN MEETINGS

2        <u>FIELD OF THE INVENTION</u>

3        This invention relates to a graphical user interface for an online collaboration

4        environment.

5        <u>BACKGROUND OF THE INVENTION</u>

6        It often happens that a user finally manages to connect to an online meeting, but shows up

7        after a significant amount of work has already been completed.  The user needs to learn

8        what's already been done; the current agenda item; and what's still to come.

9        Many technical solutions have been developed which address one or more of these

10       questions.

11       NNTP  or network news (see Ed Krol, *The Whole Internet Catalog*. O'Reilly and

12       Associates, Inc. Sebastopol, CA. 1992 for details) provides a venue in which users can

13       asynchronously post messages and responses into administered news groups (i.e.,

14       predefined groups of messages which are meant to relate to specified topic, e.g., all

15       articles in alt.sport.soccer should deal with soccer).  Only loosely structured forms of

16       interaction are provided, e.g., query-and-respond.  No other styles of interaction are

17       supported.  In particular, there is no way for users to define or participate in a particular

18       style of interaction in which there is a predefined, interrelated sequence of phases, all

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1        newsgroups being independent from one another.

2        Internet Relay Chat (IRC) (see Ed Krol, *The Whole Internet Catalog*. O'Reilly and

3        Associates, Inc. Sebastopol, CA. 1992 for details) is similar to NNTP in that it allows

4        users to post messages and responses to each other in predefined topic areas - called

5        channels in IRC. The main difference with IRC is that the interactions are synchronous

6        rather than asynchronous as in NNTP. Just as with NNTP, IRC does not enable users to

7        define or participate in a particular style of interaction in which there is a predefined,

8        interrelated sequence of phases, all channels being independent from one another.

9        Loom, a visualization tool for Usenet (NNTP) news groups, (for details, see Judith

10       Donath et al. "Visualizing Conversation" published in the *Journal of Computer Mediated*

11       *Conversation*. Volume 4, number 4, June 1999) provides a technique for displaying the

12       emotional mood ( e.g., hostile, happy) of an NNTP-based online community (e.g., a

13       Usenet newsgroup ) by analyzing the content of its interactions. Although this utility can

14       analyze online interactions and provide a graphical representation of aspects of the

15       interactions, it does not provide users with a sequenced, multiphase style of interaction, or

16       an associated graphical user interface.

17       Babble (for details, see Thomas Erickson, et al. "Socially Translucent Systems: Social

18       Proxies, Persistent Conversation, and the Design of 'Babble.'" published in *Human*

19       *Factors in Computing Systems: The Proceedings of CHI '99*. ACM Press, 1999.) provides

20       dynamic indicators of the presence and activity of all operational users with respect to the

21       available topics (i.e., discussion areas created by the users). These indicators are

22       computed using the activities of the participants (e.g., connections, postings and topic

23       switches). Although lightly structured styles of interaction are frequently adopted (e.g.,

1 interaction in the "-Commons Area-" is informal conversation, while interaction in the
2 "Babble Problems" topic consists of serious question/answer dialogs), no way is provided
3 to define a sequenced, multiphase style of interaction.

4 Online games, like chess and bridge (e.g., Chessmaster 6000 by Mindscape, Inc.) provide
5 structured and enforced styles of interaction, but not ones that (1) can be defined by the
6 users, the rules all being predefined; (2) that can have the rules changed by the users
7 *during* a game (e.g., "A queen can leap from anywhere to anywhere").

8 Coordinator and its patented method of structuring human communications (for details
9 see: Flores et al. "Method and Apparatus for Structuring and Managing Human
10 Communications By  Explicitly Defining the Types of Communications Permitted
11 Between Participants." U.S. Patent number 5,208,748  May, 4, 1993.) provides an
12 electronic mail-based system that allows users to  structure conversations and track tasks.
13 For example, a typical interaction begins with a "Request" message from person A to
14 person B, requesting something from person B by a certain date. This e-mail note asks
15 Person B to respond with a "Promise" message (promising to perform the action), with a
16 "Decline" message (declining to perform the action), or with a "Counteroffer" message
17 (offering to perform the action by a different date or to perform a different action). If B
18 promises to do the action, then a typical conversation might continue with B eventually
19 sending a "Report completion" message (indicating that the action has been performed)
20 and A replying with a "Close" message (indicating that the action was performed
21 satisfactorily).

22 The Oval implementation of Coordinator extends the base functionality by allowing
23 end-users to modify interaction rules mid interaction (for details, see Malone et al.

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1 "Experiments with Oval: A Radically Tailorable Tool for Cooperative Work" via URL

2 http://ccs.mit.edu/papers/CCSWP181/index.html#4b).

3 Thus Coordinator, implemented with Oval allows users to define and maintain structured

4 styles of online interaction. Users are still unable to handle interactions where messages

5 are posted to a group of recipients, all of whom are not known a priori (e.g., as is the case

6 in an brainstorming session where the participants include any and all contributing online

7 users). Coordinator/Oval also does not provide a dynamic, graphical representation giving

8 users with an overview and interface to a given meeting. In addition, no method or

9 interface is provided allowing users to replay all or a section of a given meeting.


10 Work Flows allow users to specify sequences of steps, e.g., the steps required to fill out,

11 submit and process a travel expense report, but do not provide users with a dynamic

12 graphic representation of a multiphase online meeting, one providing users with an

13 overview of all of the separate agenda item interactions (including indications of activity:

14 who, what and how active).


15 Thus, there remains a need for a system and method providing online users with a

16 dynamic graphic representation of the overview an agenda-driven, multiphase online

17 meeting, one enabling users to replay previous activity.


18 Sametime Meeting, a product of IBM/Lotus allows users to create and interact with an

19 instance of an online meeting, this interaction including the display of text, multimedia

20 and compound documents, the environment providing indication of users' active

21 connection to a given instance. Sametime Meeting does not, however, allow users to

22 participate asynchronously, not does it provide a visualization of the active users that

23 indicates their level activity relative to a given agenda item.

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1    <u>SUMMARY OF THE INVENTION</u>

2    The invention relates to a system for structuring an "agenda-driven meeting" (ADM) that
3    allows a distributed work group, committee, or task force to have an online meeting to
4    review the status of various ongoing projects.

5    A feature of the invention is an "agenda", consisting of a list of items (e.g., goals) that
6    defines a meeting phase, represented by a phase-shape, within which the given item is
7    discussed.

8    An optional feature of the invention is that the meeting may be non-synchronous.

9    Another feature of the invention is that making user actions visible and public supports
10   social awareness, which allows the group to enforce (or not) the interactional coherence
11   of the group via social mechanisms such as peer pressure, imitation and etiquette.

12   Another feature of the invention is a user interface consisting of two interrelated parts: A
13   phased social proxy representation that explicitly depicts the presence and activities of the
14   participants in each phase of the conversation; and a multipaned phased representation of
15   the conversation that depicts the conversation itself and the products of each of its phases.

16   Yet another feature of the invention is that four sorts of objects can be created in each
17   phase:

18          Utterances: An utterance is a labeled, time-stamped textual comment, which, with

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1      other utterances, make up the conversation in a room.

2      Pointed Queries: Pointed Queries are questions which can be directed to one or

3      more participants. A Pointed Query will call itself to the attention of a user, either directly

4      (if the user is logged onto the system), or (after a predetermined time) will send itself as

5      email to the user. The recipient of the emailed-pointed query can either click on a link to

6      go to pointed query in the context of the online system, or can type an answer (including

7      checking a "don't know") box.

8      To Do's (which may optionally be assigned to particular people)

9      Glosses (which are typically summaries of the state of an agenda item)

10      Yet another feature of the invention is that:

11      All objects, including phases, can have various states:

12      Open/Locked: An object that is "open" can be entered, edited, or answered, as

13      appropriate;

14      New Information/Seen (relative to a user): An object that has been created or

15      contains new or changed content since a user last 'looked at' it is in the "New

16      Information" state relative to that user.

17      Glitter/No Glitter (relative to a user): "Glitter" is a state that can be applied to an

18      object by a user, to attract the attention of another user; it may have an optional note

19      attached to it.

20      BRIEF DESCRIPTION OF THE FIGURES

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1    The foregoing and other objects, aspects, and advantages will be better understood from

2    the following non limiting detailed description of preferred embodiments of the invention

3    with reference to the drawings that include the following:

4    Figure 1 shows an example of an agenda-driven meeting in process, which includes text

5    and artifact display panes;

6    Figure 2 shows an example of an alternative agenda-driven meeting;

7    Figure 3 shows an example of a workflow-based agenda-driven meeting;

8    Figure 4 shows an example of an agenda-driven meeting that includes a loop;

9    Figure 5 depicts an overview of the network topology of an embodiment of the present

10    invention;

11    Figure 6 is a block diagram of an architecture of a server according to an embodiment of

12    the present invention;

13    Figure 7 is a flow diagram of the of a server program architecture according to an

14    embodiment of the present invention;

15    Figure 8 shows an example of a third-party service organization employing the invention.

16    <u>DETAILED DESCRIPTION OF THE INVENTION</u>

17    A detailed example of the preferred embodiment, is given, describing how the current

18    invention is used in the process of supporting a design meeting. An example of this is

19    depicted in Figure 1. The user interface 1000 consists of two interrelated parts: A phased

20    social proxy 1010 that explicitly depicts the presence and activities of the participants in

21    each phase of the meeting; and a phased conversation representation 1015 that depicts the

22    topics of the meeting's phases, the dialog of the current, and artifacts (e.g. Documents

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1     and drawings) related to or produced during the meeting.

2     The phased social proxy 1010 representing the meeting is a public representation - that is,

3     all participants see the same representation, and all know that the others see the same

4     representation.

5     The phased social proxy 1010 represents a given meeting by a series of simple

6     phase-shapes 1050 - 1090 connected by lines 1100 - 1130,- each phase-shape

7     corresponding to a particular phase of the meeting.  By convention, the leftmost

8     phase-shape 1050 is the first phase of the meeting, with the phase-shapes to the right

9     1060 - 1090 representing later phases respectively.  One will appreciate that the line

10     segments 1100 - 1130 could include arrow heads to indicate this sequencing explicitly.

11     The phase-shape 1060 that depicts the "current" phase in which the group is involved

12     expands to dominate  the social proxy 1010; the other phase-shapes 1050 and 1070 -

13     1090,  remain visible, but smaller. When the group progresses to the next phase (i.e.,

14     phase 3), this new  phase becomes the "current" phase, its phase-shape (1070)  expands,

15     and the previous, completed phase-shape 1060 shrinks and becomes shaded. By

16     differentiating the phase-shape of the current phase, participants are given a clear

17     indication of the primary topic of interest.  One will appreciate that other methods could

18     be employed to distinguish the phase-shape of the current phase, including, but not

19     limited to having it appear in a unique color or shape.  One will also appreciate that the

20     phased social proxy can be dynamically positioned so that the phase-shape representing

21     the current phase is located centrally in the center of the 1010 space.

22     The meeting participants are represented as small dots 1135 - 1160, and are positioned in

23     the phases of social proxy 1010 according to which phase they are currently involved in.

24     Normally, most or all participants will be in the "current" conversation phase 1060;

25     however, nothing prevents a given user from moving to a different phase, depicted by dot

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| 1 | 1135 in phase-shape 1050. |
| 2 | When participants are active in the conversation (activity meaning that they 'speak' (e.g., |
| 3 | contribute a comment), use a tool, or simply 'listen' (scroll the conversation phase-pane)), |
| 4 | their dot (one of 1135 - 1160) moves into the center of the appropriate phase-space (one |
| 5 | of 1050 - 1090); as they are idle, their dot drifts to the phase-space's periphery. This |
| 6 | graphical depiction of the level of activity is just like that used in Babble (for details, see |
| 7 | Thomas Erickson, et al. "Socially Translucent Systems: Social Proxies, Persistent |
| 8 | Conversation, and the Design of 'Babble.'" published in Human Factors in Computing |
| 9 | Systems: The Proceedings of CHI '99. ACM Press, 1999). |
| 10 | Note that since the phased social proxy 1010 is public and, hence, seen equally by all |
| 11 | participants, if a given user does move to a phase other than the current one, their |
| 12 | movement will be visible to the entire group. This explicit indication provides a powerful |
| 13 | "social affordance," one that can press users to restrict their activities to the current phase |
| 14 | so that their actions conform to that of the group. Alternatively, suppose a user does turn |
| 15 | their attention to a previous phase, causing their dot 1135 to move to a noncurrent |
| 16 | phase-shape 1050. Other participants seeing this might being to wonder why someone is |
| 17 | still looking at this phase. Perhaps there remains resolved issues related to this phase. |
| 18 | Perhaps the participant represented by dot 1135 came to the meeting late, and is |
| 19 | reviewing the previous phase to catch up to the other participants. |
| 20 | The phased social proxy 1010 also includes representations of tools, shown here as small |
| 21 | squares 1280 and 1290. Each of these shapes 1280, 1290 launches a different application |
| 22 | that can aid users in the completion of the current phase. Such applications can include, |
| 23 | but are not limited to, a timer, with which users can measure how long a given discussion |
| 24 | takes; a voting application, with which users can make a final decision by casting votes |

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1 for or against a given proposal or conclusion, or a random number generator, the products

2 of which users can employ to make decisions (e.g., who will write up the summary of the

3 given phase).

4 The current invention also includes a multipaned representation of the content of the

5 meeting 1015, consisting of three panes:

6 The goal pane 1020 indicates the goal of each phase, 1170 - 1210. One will

7 appreciate that these entries can include, but are not limited to titles (like those shown

8 1170 - 1210), short descriptions, and graphic images;

9 The conversation pane 1030 displays the comments 1230 - 1260 of the

10 conversation phase that a particular participant is viewing. Note that if user 1 has

11 selected phase 1, the pane 1030 they see will show the conversation from phase 1, while

12 if user 2 has selected phase 2, they are shown the content of phase 2. Also note that for

13 any given phase, the title 1120 of the conversation pane 1030 will match, indicating some

14 or all of the data of the phase's corresponding goal pane entry. E.g., since phase 2 is the

15 selected phase shown in figure 1, "Phase 2: Develop Design" 1180 from the goals pane

16 1020 is displayed as the title 1220 of the conversation pane 1030. Further, when one or

17 more participants decide to leave the "current" phase, and move into another (previous or

18 future phases), all participants in the current phase are shown a translucent image, or

19 "shadow pane" of noncurrent dialog, slightly offset from the standard window 1030

20 (similar to the rectangles 4120, 4180, 4190 in Figure 4). This is deliberately intended to

21 be visible and even slightly distracting; since the out-of-phase participants know that their

22 activities are visible and may distract the rest of the group (in the same way participants

23 in a face-to-face meeting know that side conversations may disrupt a meeting), it

24 encourages but does not mandate adherence to the group activity.

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1     The products pane 1040 provides pointers to artifacts related to or produced

2     during the meeting. These pointers can include, but are not limited to URLs of text, image

3     and mixed type documents.

4     The contents of the both the goals 1020 and product 1040 panes remain the same

5     regardless of which phase-shape a given user has selected.

6     Note that since all of the data in the current invention is maintained persistently, it can be

7     viewed or heard by those who are not present.

8     A final feature of the conversation representation is that participants may attach

9     annotations (similar to 'sticky notes') to a noncurrent conversation phase. These allow

10    participants to add information, even though the primary content of a phase is frozen, or

11    may not yet be created.  These presence of such annotations is indicated by the thickening

12    of relevant phase-shape's line width.  Note the difference in the width of 1050 versus

13    1060 - 1090.  One will appreciate that other graphic representations of the presence of

14    such annotations exist including, but not limited to changing the color or line type of the

15    relevant phase-shape.

16    The two components of the present invention 1010 and 1015, acting separately and in

17    tandem, support the formation of group awareness, i.e., allow participants to know what

18    others are doing, as well as supporting awareness of others' awareness. This group

19    awareness is essential to the present invention in that it aims to support coherent group

20    interaction (e.g., everyone attending to the same conversational phase) without rigidly

21    mandating it. The following are the key aspects of social awareness that are supported:

22         In-phase versus out-of-phase (Who is where right now): Both components of the

23         user interface 1010 and 1015 make it easy to see who (and how many) of those

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1  synchronously present are in the "current" phase (as defined by the group), versus

2  other phases. In the social proxy 1010 this can be seen by the distribution of dots

3  in the various components of the phase-spaces; in the conversation representation

4  1015 this can be seen by the presence of shadow panes

5  Active versus inactive (who is active right now): The social proxy 1010 allows

6  participants to assess the degree of activity of the members of the group by noting

7  the position of participants' dots relative to the center of each phase space

8  Another benefit of the present invention is that both the phased conversation

9  representation 1015 and the phased social proxy 1010, by adding structure and richness

10  to the conversation, permit it to be archived in novel forms. One such form is that of a

11  persistent archive of the conversation with its contents organized according to

12  conversation phases.

13  Because the activity of conversations participants is archived, the conversation can be

14  replayed. Participants, or others interested in the conversation, can replay it at high speed

15  to get a sense of the number of participants in each phase, the degree of coherence, and

16  so on. To replay a previous completed phase, a player can select the corresponding

17  phase-shape (e.g., 1050). As already described, this will result in the associated

18  conversation being displayed in the conversation pane 1030. In the preferred

19  embodiment, the conversation pane 1030 includes a scroll bar 1225, which can be used to

20  scroll the presented conversation back and forth. Note that the data displayed in the

21  Phased Social Proxy 1010, will track that displayed in all panes of the phased

22  conversation representation 1015. Thus, the objects 1270 and 1275 displayed in products

23  pane 1040, will only appear at the point in the meeting that they were created. Similarly,

24  if object 1270 is deleted at some point in the meeting, its representation will vanish when

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1   this point is reached during replay.

2   One will appreciate that an archived, completed phase of a given meeting can be replayed

3   by a given user either during a later phase of the meeting, or after the entire meeting has

4   been finished.  One will also appreciate that the current invention also covers other

5   methods of replaying the conversation, including but not limited to providing users with a

6   VCR-like set of controls (i.e., rewind: ""<<"; play: ">"; fast forward: ">>"; and stop:  c ).

7   One will also appreciate that since a given meeting is provided by a persistent online

8   service (as will be described in detail with reference to figures 5 - 7), a given user can

9   participate both synchronously, responding in real time to inputs made by other others; or

10   asynchronously, interacting when they are able, adding data entered previously, or adding

11   comments to phases that have not yet begun.

12   One with regular skill in the art will appreciate that during the use of an "instance" of the

13   current invention, i.e., during a meeting held according to an embodiment of the

14   invention, the configuration of the given instance could be modified (e.g., by a user with

15   sufficient rights, say the meeting manager). These modifications might include, but are

16   not limited to the addition or deletion of one or more phases, as well as the reordering of

17   one or more phases.

18   One with regular skill in the art will also appreciate that a given phase's state (e.g.,

19   completed) can be set either by a single user (e.g., one with sufficient rights or in a

20   particular role, like the moderator of the particular phase);  or by a set of users, including,

21   but not limited to a vote by all users currently active in the given phase.

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1　The current invention also provides three extensions to the graphical user interface and

2　multiphase online collaboration method (discussed in detail with reference to figures 2, 3,

3　and 4).

4　Figure 2 depicts an alternative version of a phased social proxy 2000. Just as in 1000,

5　this version uses phase-shapes 2010 - 2030 to represent the phases of a given meeting -

6　the meeting represented here only having three phases, one phase-shape 2030 indicating

7　that the phase associated with it has been completed. Here too, active participants are

8　represented with dots 2040 - 2060, a given dot's location indicating in which phase the

9　associated user is currently participating, with the dot's distance from the center of the

10　phase-shape indicating the associated user's level of activity. The phase-shapes

11　2010-2030 in figure 2 are not connected to each other in any way, as are those 1050-1090

12　in 1000. This indicates that there is no preset sequence to the meeting's phases.

13　Phased social proxy 2000 also contains 3 new types of icons: arrows 2080 - 2100;

14　squares 2070, 2120 and 2130; and triangles, 2110 - 2115.

15　　　Pointed Queries - represented by standalone arrows 2080 - 2100 pointing either

16　　　towards or away from the phase-shape to which they are associated - are questions

17　　　which can be directed to one or more participants. An arrow pointing away from a

18　　　given phase-shape, e.g., 2080 or 2100, represents a pending query, while an arrow

19　　　2090 pointing towards a given phase-shape represents a query that has already

20　　　been answered. A Pointed Query will call itself to the attention of a user, either

21　　　directly (if the user is logged onto the system), or (after a predetermined time) will

22　　　send itself as email to the user. The recipient of the emailed-pointed query can

23　　　either click on an arrowhead to go to pointed query in the context of the online

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1    system, or can type an answer (including checking a "don't know") box (not

2    shown). The answer to a given completed pointed query (e.g., 2090) can be

3    accessed by selecting its arrow. Methods by which a given response can be seen

4    include, but are not limited to having the response's data displayed in a pop-up

5    window, or sent in an email.


6    To Do's - represented by squares 2070, 2120 and 2130 located next to the phase

7    shape to which they are associated - are indicators of tasks that still need to be

8    completed. To Do's may optionally be assigned to particular people. Such task

9    assignments can include, but are not limited to the gathering of additional related

10   information, e.g., a search for prior art after a patent disclosure meeting, or

11   contacting another group of users to see the if they would like to join the current

12   project.


13   Glosses - represented by triangles 2110 - 2115 are typically summaries of the state

14   a given phase, a given gloss being associated with the phase-shape to which it is

15   nearest. Note that there can be glosses for both active phase, like that represented

16   by phase-shape 2020, as well as ones that have been completed, like that

17   represented by phase-shape 2030. One will appreciate that a gloss can be used to

18   indicate both intermediate (e.g., "Two conflicting solutions are being discussed;

19   everyone seems dissatisfied") and final (e.g., "One of the two solutions was finally

20   chosen, but a large number of group members are not pleased") comments

21   regarding a given phase.


22   In addition a user can mark an object (including a room) with Glitter (relative to a user).

23   "Glitter" is a state that can be applied to an object by a user to attract the attention of

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1      another user; it may have an optional note attached to it.

2      One will also appreciate that participants can take on one of several roles, each of which

3      has permissions associated with it:

4

| Role | Conversation | Email | Meeting Creation | Purpose of Role |
|------|--------------|-------|------------------|-----------------|
| Chair | rwx (read/write/ execute) | receive | rwx | Run meeting |
| Participant | rwx | receive | | Normal participant |
| Lagger/Lurker | r | --- | --- | Non-partic ipant, or someone who will be out of email contact for the duration of the meeting |

8      Modes of Use: As noted above, this is intended to allow groups to have online,

9      not-necessarily synchronous status meetings. At one extreme one could imagine that only

10     the meeting's chairs actually enter the online space, conducting the entire meeting by

11     sending out pointed queries, and using the responses to generate Glosses and To Dos. At

12     the other extreme, we could imagine a fully synchronous meeting, in which either

13     everyone moves synchronously from item to item, or in which participants spread out

14     over the agenda, gravitating to the most relevant topics, and filling in their statuses. In

15     this situation, pointed queries could be used to attract the attention of a particular

16     participant when their input is required.

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| 1 | Figure 3 depicts yet another version of the phased social proxy 3000, which has 2 new |
| 2 | aspects. The first is that its phase-shapes 3010 - 3060 are not all the same geometric |
| 3 | shapes. There are two rectangles 3010 and 3060, three circles 3020, 3040 and 3050; and |
| 4 | one diamond 3030. These different shapes can be used to indicate types of phase tasks. |
| 5 | So for example: |
| | |
| 6 | Rectangular phase-shapes, like 3010 and 3060, could indicate introductory and |
| 7 | summary phases; |
| | |
| 8 | Circular phase-shapes, like 3020, 3040 and 3050, indicating design and |
| 9 | development; and |
| | |
| 10 | Diamond shapes, like 3030, indicating a decision point, e.g., "Will we use a |
| 11 | procedural or object-oriented programming language?"). |
| | |
| 12 | The other new aspect of the phase social proxy 3000 is that in addition to connectors |
| 13 | 3120 - 3160 between the phase-shapes 3010 - 3160, like those 1100 - 1130 in 1000, one |
| 14 | of 3000's phase shapes 3030 has two connectors coming from it, 3140 and 3150. This is |
| 15 | a graphical representation of how the choice made in the phase corresponding to |
| 16 | phase-shape 3030 determines which phase is executed next, that corresponding to 3040, |
| 17 | or 3050. This ability to represent conditional branching enables users to employ the |
| 18 | current invention to conduct online meeting based on a given business procedure, like a |
| 19 | workflow. Workflows can include but are not limited to, purchasing or travel expense |
| 20 | accounting. Thus, 3000 might be an overview of the execution of an travel expense |
| 21 | account, with phase-step 3010 being where the employee enters their expenses; 3020 |
| 22 | where the employee and their boss discuss a particular expense item; 3030 where the boss |

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1     and the account department determine which project will pay for the given trip; 3040 and

2     3050 corresponding to the two possible projects from which the fund are transferred; and

3     3060 being where the overall transaction summary reports are created and sent to the

4     related parties.

5     The current invention also anticipates how a phase social proxy could be automatically

6     generated from a existing workflow specification.

7     Figure 4 depicts a final version of the phased social proxy 4000, which includes a graphic

8     representation of a loop. As in 3000, the diamond-shaped phase-shape 4050, represents a

9     choice point. The difference in 4000 is that one of the connectors 4110 connects back to

10    a previously visited phase-shape 4020. This represents the case of a loop structure, with

11    phase-shapes 4020 through 4040 representing the loop steps to execute respectively each

12    time through the loop, and with phase-shape 4050 representing the loop termination

13    condition. Whenever the discussion reaches phase-shape 4050, the users must make a

14    choice, and, depending on their answer, activity continues at either 4020 again, or at

15    4060.

16    In addition to providing a dynamically updated representation of the current state of the

17    online meeting and the activity of its users, the current invention also provides access to a

18    graphical user interface to previously executed passes through the loop. Each of 4170,

19    4180 and 4190 (each a phase-shape-loop) represent passes through the loop, 4190 - the

20    bottom-right-most one representing the most recent. If a user wants to see the loop's

21    phase-shapes - including glosses, pointed queries and To Do's - as they looked during

22    previous passes through the loop, they can select the corresponding phase-shape-loop,

1    For example, 4000 could represent the online discourse regarding the iterative design of a

2    prototype, the phase-shapes representing the following topics:

3         4010, determination of the prototype's goals and metrics;

4         4020, development or update of the prototype's design;

5         4030, prototype implementation;

6         4040, user-testing of the prototype's latest implementation;

7         4050, evaluation of whether the prototype's goal's have been met; and

8         4060, Overall usage and installation documentation.

9    If a given user wanted to see the previous pass through the design-implement-test loop,

10   they could select the 4180 phase-shape-loop.  This would bring 4180 to the foreground,

11   showing 4020-4040 as they looked at the beginning of this loop's execution.  By scrolling

12   through the loop's execution, e.g., using the 1225 scroll bar, this activity that took place

13   during this loop's execution can be reviewed.

14   One with regular skill in the art will appreciate that graphical representations of additional

15   meeting-related products are also anticipated by the current invention.  These include, but

16   are not limited to arrow-shaped boxes positioned adjacent to a phased social proxy, which

17   represents agenda items proposed for a subsequent meeting.

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1    The preferred implementation of the current invention is as a web-based (HTTP-based)

2    network application, as will be described in detail with reference to Figures 5,6 and 7.


3    Figure 5 depicts an example of an overall logical network topology within which

4    preferred embodiment of the current invention runs.  As shown, a server 5010 (which will

5    be described in detail with reference to figures 6 and 7)), and clients 5020 - 5040 are all

6    connected to the network 5000, through which they communicate. Although only three

7    clients 5020 - 5040 are shown in Figure 5, the present invention is applicable to any

8    number of clients.


9    The server 5010 can be any computing node able to act as an HTTP server.  This

10    includes, but is not limited to, the products sold by IBM under the trademarks ThinkPad

11    or PowerPC, running  the operating system and server application suite sold by Microsoft

12    under the trademark Windows NT.


13    Examples of the network 5000 include, but are not limited to, the Internet and private

14    intranets.


15    The each client 5020 - 5040 can include any network node able to act as an HTTP client.

16    Examples include, but are not limited to, an IBM ThinkPad running Windows 95 and a

17    web browser such as Microsoft's Internet Explorer, or Apple's Power Macintosh running

18    MacOS 8.5.6 and a web browser such as Netscape's Navigator.  Clients also include

19    network-connectable mobile (i.e. portable) devices such as that sold under the trademark

20    WorkPad by IBM, as well as smart cellular telephones (i.e., devices which can act as a

21    cellular telephone as well as run network applications, like web browsers), like that sold

22    under the trademark Nokia 9000i by Nokia.

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| | |
|---|---|
| 1 | In the preferred implementation, the client application is an applet retrieved from the |
| 2 | server 5010, and run via the client's HTTP client (web browser). Also, in the preferred |
| 3 | implementation, this applet, in addition to handling data display and user interactions |
| 4 | (e.g., data entry and mouse events), also constantly polls the server 5010 for updated data, |
| 5 | this data being the latest version available for the meeting instance currently being |
| 6 | viewed. Those with regular skill in the art will appreciate that there are other methods of |
| 7 | retrieving such data, including, but not limited to having the server push updates, |
| 8 | whenever available down to the client, the client listening on a port known to the server |
| 9 | (for details, see Douglas Comer, Internetworking with TCP/IP, Vol. 1 Principles, |
| 10 | Protocols and Architecture. Prentice Hall, Englewood Cliffs, New Jersey, 1991. ). |
| | |
| 11 | Figure 6 depicts a more detailed example of the server 5010, which hosts the online |
| 12 | Agenda-Driven Meeting environment. The server 5010 preferably includes a CPU 6000, |
| 13 | a network interface 6010, a storage device 6020 such as a disk or DASD, and memory |
| 14 | 6030, such as RAM. According to the present invention, the Agenda-Driven Meeting |
| 15 | logic 6140 (as will be discussed in more detail with reference to Figure 7), is preferably |
| 16 | embodied as computer executable code that is loaded from remote (e.g., over the network |
| 17 | via the network interface 6010) or local permanent optical (CD-ROM) or magnetic |
| 18 | storage such as disk, or DASD 6020 into memory 6030 for execution by CPU 6000. The |
| 19 | memory 6030 preferably includes an HTTP handler 6050, an Agenda-Driven Meeting |
| 20 | Handler 6060 (discussed in detail with reference to Figure 7), and an Agenda-Driven |
| 21 | Meeting database 6070. The HTTP handler 6050 can be any standard HTTP server, such |
| 22 | as the product sold by the IBM under the trademark WebSphere. |
| | |
| 23 | The Agenda-Driven Meeting database 6070 can be any application providing access and |
| 24 | persistent management of data, such as that sold by IBM under the trademark DB/2. |

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1  Those with regular skill in the art will also appreciate that the Agenda-Driven Meeting
2  database 6070 could be run on another remote network  connected node and accessed via
3  the network 5000.

4  Figure 7 depicts an example of the Agenda-Driven Meeting logic 6140.  As shown, the
5  server 5010 waits for input in 7000.   The input is checked in step 7010, and unless it
6  involves HTTP input, control is passed to a miscellaneous handler 7030, which performs
7  conventional functions. One with regular skill in the art will appreciate that the check
8  done in step 7010, could be accomplished by verifying that the TCP/IP port by which the
9  server was contacted corresponds to that used to handle HTTP protocol, typically 80. If
10  the input is HTTP-related, then the input is further checked in step 7020 to determine if it
11  is Agenda-Driven Meeting related.  If not, control is passed to the HTTP Handler 6050.
12  Otherwise control is passed to the Agenda-Driven Meeting Handler 6060. One with
13  regular skill in the art will appreciate that the check performed in step 7020 consists of
14  that parsing the HTTP request and checking whether it contains one of a finite set of
15  commands unique to the Agenda-Driven Meeting Handler 6060. Following the
16  completion of any of the handlers, i.e., steps 6050, 6060 or 7030, the flow continues at
17  step 7000, where the server 5010 waits for input.

18  The Agenda-Driven Meeting Handler 6060 shown in figures 6 and 7, is the interface that
19  responds to all requests concerning agenda-driven meeting, thus controlling the creation
20  and use of such online collaboration environments. As discussed with reference to figures
21  1,2,3, and 4, Agenda-Driven Meeting requests include the following:

22        Creating a new instance;

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1          Connecting to a existing active instance (active or completed);

2          Entering data into a active instance;

3          Retrieving data from an (active or completed) instance;

4      For each request that arrives, the Agenda-Driven Meeting Handler 6060 determines its

5      type and applicable agenda-driven meeting instance, processes the given event, updates

6      the given meeting's data in the database 6070, updates the graphical representation for the

7      given meeting instance - also stored in the database 6070; and then sends the updated

8      graphical representation out to all active users of the given meeting instance.

9      The Agenda-Driven Meeting Handler processes different requests slightly differently:

10         If the given request is to one to create a new agenda-driven meeting instance,

11           then:

12              An entry for the new meeting is added to the database;

13              The number of phases and their interrelationship, if any, is added

14            to the entry

15              A phased social proxy is created for the instance and stored in the

16            database entry, this graphic including a representation of the creator and

17            their level of activity;

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1                      The social proxy is added to the database entry;

2                      All data for the instance is communicated back to the creator's

3               client application.

4           If the given request is one for a user to connect to any existing meeting instance,

5           then:

6                      The user's id is added in as one of the active users in the requested

7               meeting instance's database entry;

8                      The instance's phased social proxy is updated to reflect the new

9               user's becoming active, this new proxy being stored in the instance's

10              database entry;

11                     The meeting instance's updated data, including its phased social

12             proxy, is sent to all active users;

13          If the given request is one from a user asking to retrieve data from an existing

14          meeting instance, then:

15                     The particular piece of data being requested is identified;

16                     The requester's access rights are checked to verify that they view

17             the requested data, the server returning a warning to the requesting user if

18             not;

1         The given meeting instance's phased social proxy is updated, to
2     reflect the retrieval of the given piece of data (e.g., the given user's dot
3     moves closer to center of their current phase-shape to reflect their level of
4     activity), the modified phased social proxy added to the instance's database
5     entry;

6         The fact that the given user requested the given piece of data is
7     written into the meeting instance's database entry;

8         The meeting instance's updated data, including its phased social
9     proxy, is sent to all active users;

10         The requested data is sent to the requesting user.

11     If the given request is one from a user asking to enter data into an existing
12     meeting instance, then:

13         The particular piece of data the requester is asking to add (e.g., a
14     comment, To Do, or Pointed Query) is identified;

15         The requester's access rights are checked to verify that they are
16     authorized to add the given piece of data, the server returning a warning to
17     the requesting user if not;

18         The data is added into the given meeting instance's database entry;

1        The given meeting instance's phased social proxy is updated to

2        reflect the addition of the given piece of data, the modified phased social

3        proxy added to the instance's database entry;

4        The fact that the given user added the given piece of data is written

5        into the meeting instance's database entry;

6        The meeting instance's updated data, including its phased social

7        proxy, is sent to all active users;

8        If the given request is one from a user asking to retrieve an archived meeting

9        instance, then:

10        The particular meeting instance the requester wants is identified;

11        The requester's access rights are checked to verify that they are

12        authorized to view the given instance, the server returning a warning to the

13        requesting user if not;

14        The server creating a new read-only version meeting instance,

15        using the data retrieved from the requested meeting instance;

16        The new meeting instance's updated data, including its phased

17        social proxy, is sent to all active users;

18        If the given request is one from a user asking to create a template from the current

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1    meeting instance, then:

2              The user is prompted for a name for the new meeting template; and
3         then

4              A new template is stored in the database, using the given name, the
5         content of the template, being that of the current meeting's agenda (i.e.,
6         specification of the phases, their types and the interrelationship between
7         them.

8    The present invention also provides a method by which a third party service organization
9    can make the agenda-driven meeting facility available for use by members of a customer
10   organization. This process is depicted in figure 8. As shown, the first step 8000 is to
11   ensure that the customer has the required Agenda-Driven Meeting server, such as that
12   depicted and described in detail with reference to Figure 6, which includes the HTTP
13   Hander 6050, the Agenda Driven Meeting Handler 6060, and the Agenda Driven Meeting
14   Database 6070. Next, in step 8010, the service organization determines types of meetings
15   that are useful for the customer. Methods by which this determination could be
16   accomplished include reviewing previous meeting types, e.g., by reviewing the customer
17   organization's past calendars; or by interviewing employees and asking them their
18   opinion. One with regular skill in the art will appreciate that interviewers could provide
19   examples of types of meetings, and ask which of samples seemed most applicable. One
20   with regular skill in the art will also appreciate that templates could either be provided
21   one-by-one or in sets, members of which would be related in some way. Finally, in step
22   8020, the service organization would add these templates to the customer's Agenda
23   Driven Meeting database 6070. With this service, the customer would have a specially

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1    filtered set of templates available to them when they began using the Agenda Driven
2    Meeting facility, the set including needed meeting types, while not having unrelated
3    meeting types that would only serve to distract users.  One with regular skill in the art will
4    further appreciate that the service organization could also provide updates and or
5    additions to the templates, also, potentially specialized for the particular customer. These
6    upgrades and additions could even be supplied on a periodic basis, e.g., yearly.

7    Another benefit of the present invention is that both the Phase Conversation
8    Representation and the Phased Social Proxy,  by adding structure and richness to the
9    conversation, permit it to be archived in novel forms:

10        The archiving of the content for each phase: A result of the use of the present
11        invention for carrying out semi-structured  conversations is a persistent archive of
12        the conversation with its contents  organized according to conversation phases.

13        The archiving of conversational  activity: Because the activity of conversations
14        participants is archived, the conversation  can be replayed. Participants, or others
15        interested in the conversation, can  replay it at high speed to get a sense of the
16        number of participants in each  phase, the degree of coherence, and so on.

17    Variations described for the present invention can be realized in any combination
18    desirable for each particular application.  Thus particular limitations, and/or embodiment

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1 enhancements described herein, which may have particular advantages to a particular

2 application need not be used for all applications. Also, not all limitations need be

3 implemented in methods, systems and/or apparatus including one or more concepts of the

4 present invention.

5 The present invention can be realized in hardware, software, or a combination of

6 hardware and software. A visualization tool according to the present invention can be

7 realized in a centralized fashion in one computer system, or in a distributed fashion where

8 different elements are spread across several interconnected computer systems. Any kind

9 of computer system - or other apparatus adapted for carrying out the methods and/or

10 functions described herein - is suitable. A typical combination of hardware and software

11 could be a general purpose computer system with a computer program that, when being

12 loaded and executed, controls the computer system such that it carries out the methods

13 described herein. The present invention can also be embedded in a computer program

14 product, which comprises all the features enabling the implementation of the methods

15 described herein, and which - when loaded in a computer system - is able to carry out

16 these methods.

17 Computer program means or computer program in the present context include any

18 expression, in any language, code or notation, of a set of instructions intended to cause a

19 system having an information processing capability to perform a particular function

20 either directly or after conversion to another language, code or notation, and/or

21 reproduction in a different material form.

22 Thus the invention includes an article of manufacture which comprises a computer usable

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|---|---|
| 1 | medium having computer readable program code means embodied therein for causing a |
| 2 | function described above. The computer readable program code means in the article of |
| 3 | manufacture comprises computer readable program code means for causing a computer to |
| 4 | effect the steps of a method of this invention. Similarly, the present invention may be |
| 5 | implemented as a computer program product comprising a computer usable medium |
| 6 | having computer readable program code means embodied therein for causing a a function |
| 7 | described above. The computer readable program code means in the computer program |
| 8 | product comprising computer readable program code means for causing a computer to |
| 9 | effect one or more functions of this invention. Furthermore, the present invention may be |
| 10 | implemented as a program storage device readable by machine, tangibly embodying a |
| 11 | program of instructions executable by the machine to perform method steps for causing |
| 12 | one or more functions of this invention. |
| 13 | It is noted that the foregoing has outlined some of the more pertinent objects and |
| 14 | embodiments of the present invention. This invention may be used for many |
| 15 | applications. Thus, although the description is made for particular arrangements and |
| 16 | methods, the intent and concept of the invention is suitable and applicable to other |
| 17 | arrangements and applications. It will be clear to those skilled in the art that |
| 18 | modifications to the disclosed embodiments can be effected without departing from the |
| 19 | spirit and scope of the invention. The described embodiments ought to be construed to |
| 20 | be merely illustrative of some of the more prominent features and applications of the |
| 21 | invention. Other beneficial results can be realized by applying the disclosed invention in |
| 22 | a different manner or modifying the invention in ways known to those familiar with the |
| 23 | art. |

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1  Having described embodiments for peer-to-peer interaction and more particularly to a

2  method for flexibly relating information, it is noted that modifications and variations can

3  be made by persons skilled in the art in light of the above teachings. It is therefore to be

4  understood that changes may be made in the particular embodiments of the invention

5  disclosed which are within the scope and spirit of the invention as defined by the

6  appended claims. Having thus described the invention with the details and particularity

7  required by the patent laws, what is claimed and desired protected by Letters Patent is set

8  forth in the appended claims.

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